Dual operational amplifier

BA728/BA728F/BA728N

The BA728, BA728F, and BA728N are ICs with two independently functioning operational amplifiers featuring internal phase compensation. These products offer a wide range of operating voltages, from 3 to 18V (±1.5 to 9V) and are high-performance operational amplifiers which can be driven from a single power supply within the in-phase mode input range, including a negative power supply.

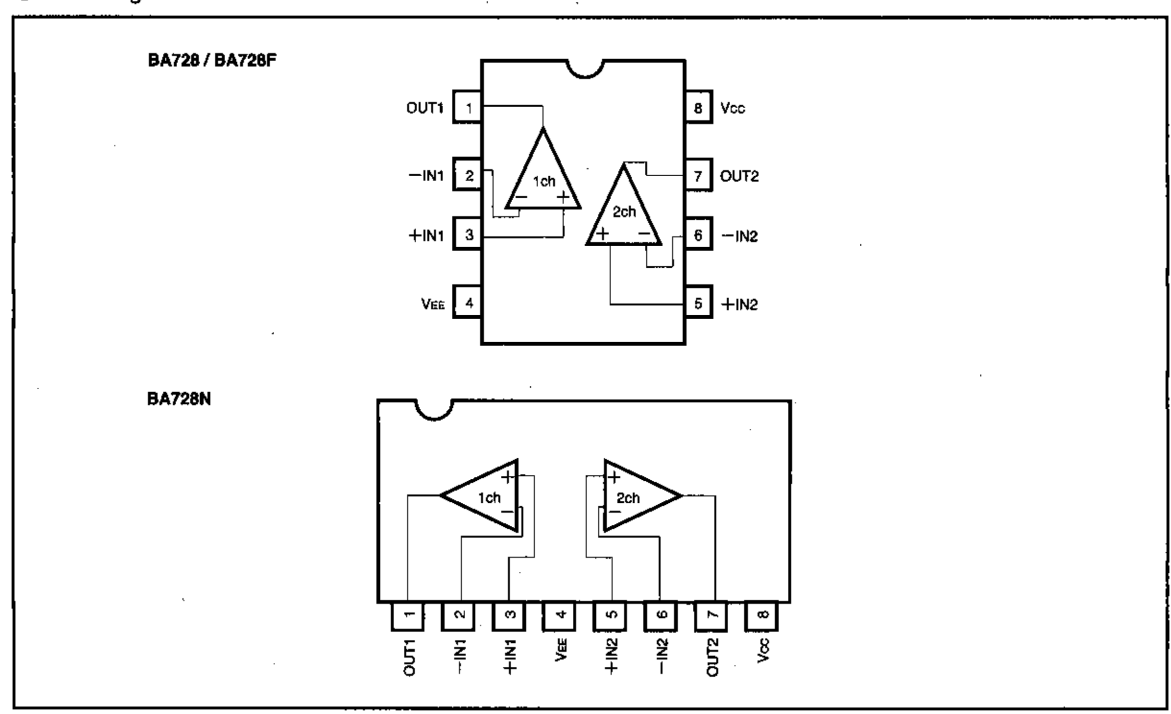
●Applications

Ground sensing small-signal amplifiers
Control amplifiers requiring high phase margin, such as motor drivers
Amplifiers operated on low voltages
Capacitive loaded amplifiers

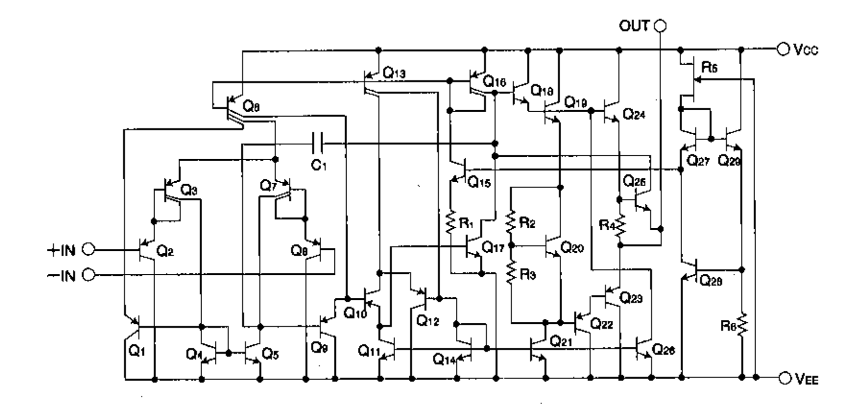
●Features

1) Can be driven from a single power supply.
2) Low power.
3) Pin layout is the same as that of the general-purpose 4558 operational amplifier.
4) When driven from a single power supply, the power supply voltage ranges from 3 to 18V.
5) When driven from a dual power supply, the power supply voltage ranges from ±1.5 to ±9V.
6) Output is protected against short-circuits.
7) Output block is operated as a class AB to minimize crossover distortion.
8) Low input bias current of 10nA (typ.).
9) Each package contains two operational amplifiers.
10) Internal phase compensation provided.

●Block diagram



●Internal circuit configuration diagram



●Absolute maximum ratings (Ta=25℃)

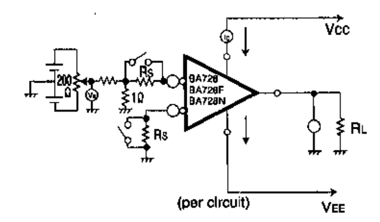
Parameter	Symbol	Limits			Unit
		BA728	BA728F	BA728N	
Power supply voltage	V_{CC}	18 (±9)	18 (±9)	18 (±9)	V
Power dissipation	Pd	600*	450*	900*	mW
Differential input voltage	V_{ID}	V_{CC}	V_{CC}	V_{CC}	V
In-phase input voltage	V_I	−0.3~V_{CC}	−0.3~V_{CC}	−0.3~V_{CC}	V
Operating temperature	Topr	−20~75	−20~75	−20~75	℃
Storage temperature	Tstg	−55~125	−55~125	−55~125	℃

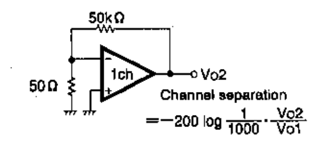
* For Pd values, please see Pd characteristic diagram.
* Values are those when BA728F is mounted on a glass epoxy PCB (50 mm x 50 mm x 1.6 mm).

●Electrical characteristics (unless otherwise noted, Ta=25℃, V_{CC}=+6V, V_{EE}=−6V)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Conditions
Input offset voltage		V_{IO}	−	2	10	mV	−
Input offset current		I_{IO}	−	1	50	nA	−
Input bias current		I_B	−	10	250	nA	−
High amplitude voltage gain		Av	86	100	−	dB	R_L≧2kΩ
Common mode input voltage		V_{ICM}	4~−6	4.5~−6	−	V	−
Maximum output voltage		V_{OM}	±3.0	±4.5	−	V	R_L≧2kΩ
Common mode rejection ratio		CMRR	70	90	−	dB	−
Power supply voltage rejection ratio		PSRR	−	30	150	μV/V	−
Slew rate		S. R.	−	0.7	−	V/μS	Av=1, R_L=2kΩ
Maximum frequency		f_T	−	0.7	−	MHz	−
Channel separation		CS	−	120	−	dB	−
Maximum output current	source	Isource	−	20	−	mA	V_{IN}^+=1V, V_{IN}^-=0V
	sink	Isink	−	10	−	mA	V_{IN}^-=1V, V_{IN}^+=0V

●Measurement circuits





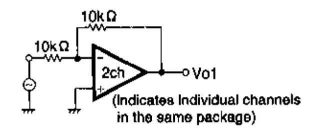


Fig. 1 Channel separation measurement circuit

●Electrical characteristic curves

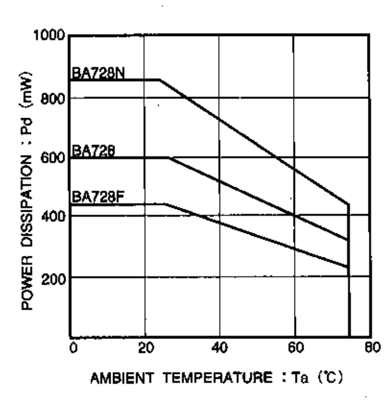


Fig.2 Power dissipation - ambient temperature characteristic

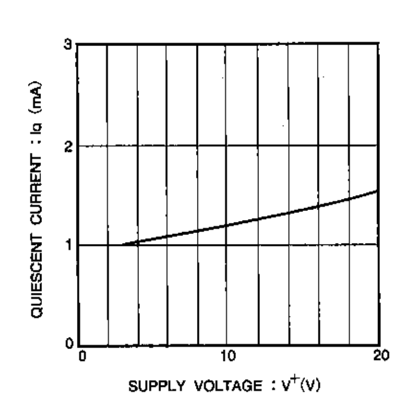


Fig.3 Quiescent current - power supply voltage characteristic

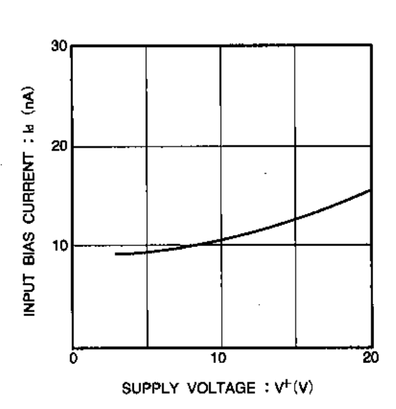


Fig.4 Input bias current - power supply voltage characteristic

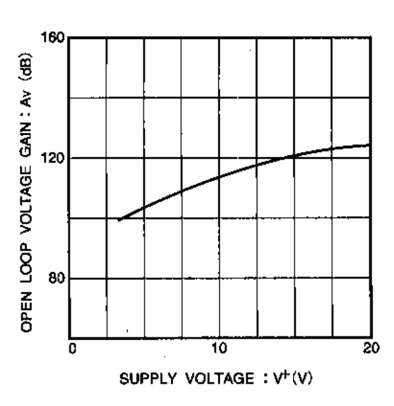


Fig.5 Open loop voltage gain - power supply voltage characteristic

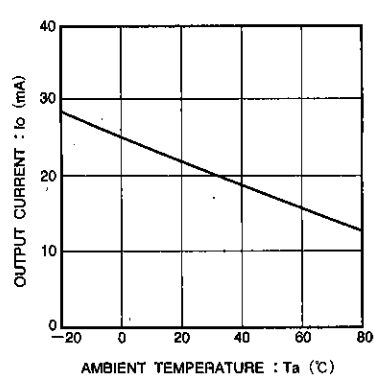


Fig.6 Current control characteristic

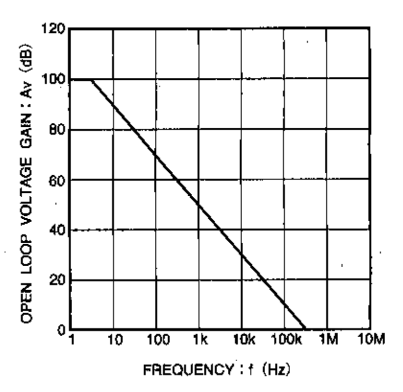


Fig.7 Open loop voltage gain - frequency characteristic

●Electrical characteristic curve

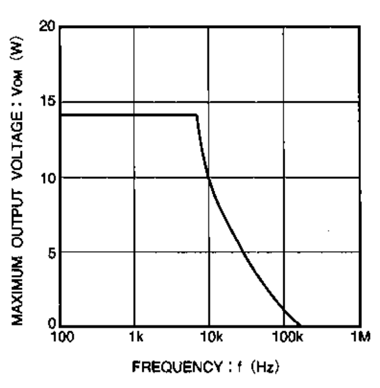


Fig.8 Maximum output voltage - frequency characteristic

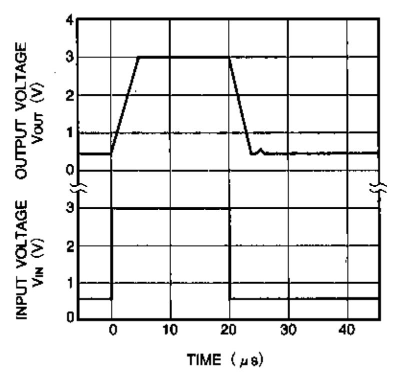


Fig.9 Output response characteristic

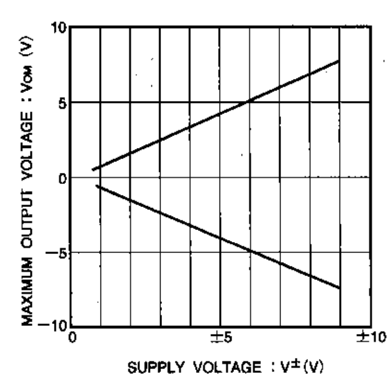


Fig.10 Maximum output voltage - power supply voltage characteristic

●Operation notes
Unused circuit connections
If there are any circuits which are not being used, we recommend making connections as shown in Figure 11, with the non-inverted input pin connected to the potential within the in-phase input voltage range (V_{ICM}).

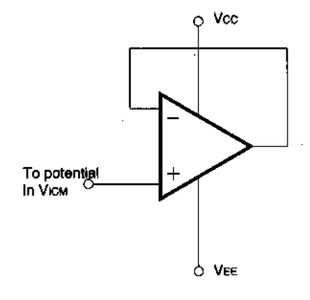


Fig.11 Unused circuit connections

●External dimensions (Units: mm)

